QNX Essential Plus

A hands-on training workshop on the QNX Software Development Platform

Overview

This course provides an introduction to the QNX® Neutrino® RTOS and the QNX® Momentics® IDE. It focuses on the technology and tools which are unique to QNX®, and aims to get you started quickly with the QNX® development and runtime environment.

Various hands-on exercises are part of the course, giving you practical experience with the technology presented.

The course will be a very condensed training; it cannot possibly cover the entire range of topics related to QNX®, nor can it cover any of its topics in full depth. For this reason, one "open workshop" day is held at the end of the week. During this day, various course topics can be discussed and explored in greater depth, course exercises can be extended to provide code examples for special needs, or off-agenda topics can be presented. The agenda for this day will be set by the course participants throughout the week.

Prerequisites

All attendees must have a good working knowledge of C, a general knowledge of operating systems, and at least basic experience using Eclipse-based development environments. Familiarity with embedded systems or real time concepts is an asset.

Agenda

Day	Start	End	Module Title
Monday	09:00	12:00	QNX® Neutrino® RTOS Architecture
	12:00	13:00	*Lunch*
	13:00	15:00	Eclipse and the QNX® Momentics® IDE
	15:00	17:00	Processes, Threads, and Synchronization, Part I
Tuesday	09:00	10:30	Processes, Threads, and Synchronization, Part II
	10:30	12:00	Interprocess Communication, Part I
	12:00	13:00	*Lunch*
	13:00	17:00	Interprocess Communication, Part II
Wednesday	09:00	12:00	Timers, Clocks, and Timeouts
	12:00	13:00	*Lunch*
	13:00	13:30	Post-mortem Debugging
	13:30	14:30	Introduction to Hardware Programming
	14:30	17:00	Embedding QNX® Neutrino®
Thursday	09:00	12:00	System Profiling
	12:00	13:00	*Lunch*
	13:00	14:00	Application Profiling
	14:00	17:00	Introduction to Resource Managers
Friday	09:00	12:00	Open workshop, Part I
	12:00	13:00	*Lunch*
	13:00	17:00	Open workshop, Part II

Course Modules

QNX® Neutrino® RTOS Architecture

Get an overview of the QNX® Neutrino® system architecture, the Neutrino microkernel, the process manager, the kernel's real-time scheduler, and more.

Eclipse and the QNX® Momentics® IDE

The Eclipse framework and platform are used as a powerful basis in numerous development environments today.

Find out how the QNX® Momentics® IDE extends the well-known Eclipse platform in many useful ways, learn how to access your target system from within the IDE, and how you can use launch configurations to work efficiently when running or debugging your applications.

Processes, Threads, and Synchronization

Modularity and independency are important aspects in the design of a robust real-time system. Processes and threads provide these key features.

See how to structure a system design using separate processes and threads, how to start and stop processes and threads, and how to synchronize access to resources via QNX® Neutrino® RTOS and POSIX function calls. Several hands-on lab exercises form a significant component of this section.

Interprocess Communication

With QNX® Neutrino®'s microkernel architecture, much of the system's functionality is distributed across various processes. Hence, communication between processes is absolutely crucial.

Explore the various methods that the QNX® Neutrino® RTOS provides for processes to exchange information and control. The focus is on QNX message passing, but we will also examine pulses, shared memory and more.

Timers, Clocks, and Timeouts

In a real time system, developers often need to keep track of real time events, or schedule periodic tasks.

Get to know the many functions that deal with real time, timers, and kernel timeouts.

A hands-on exercise will illustrate how to generate and handle periodic events.

Post-mortem Debugging

See how QNX® Neutrino® and Momentics® can assist you in doing post-mortem analysis of program crashes.

Introduction to Hardware Programming

Dealing with hardware may require various techniques – accessing I/O ports or device memory, DMA, and handling interrupts.

Find out about port and memory access, DMA memory allocation, and the ease and convenience of interrupt handling under QNX® Neutrino®.

Embedding QNX® Neutrino®

Become familiar with the internals of Neutrino® boot images, the boot process, and how to create your own boot images using the QNX® Momentics® IDE.

System Profiling

With system profiling, it is possible to examine a system as a whole to see what's going on; detail is available down to the kernel level and at a very high resolution in time.

Start out by covering what is happening on the kernel side and how to do the necessary setup. Continue to see how to log the activity through the QNX® Momentics® IDE, from the command line, or under program control. Explore how to use the IDE's system profiling perspective to analyze the resulting data, and finish off by learning how to insert your own data into kernel logs.

Application Profiling

With application profiling, it is possible to pinpoint which parts of the code are consuming the most CPU, at both the function level and the source-line level.

Learn how to use the application profiler in the QNX® Momentics® development suite to profile a single process. Find out how to use that information to make your code more efficient. Both live and post-mortem profiling are covered.

Introduction to Resource Managers

Most services, file systems, and device drivers are accessible via the pathname space, and the vast majority of these is built on top of the QNX® Neutrino® resource manager framework. Using this framework, any process can let other processes access it using only a pathname and simple POSIX file operations.

Find out about the capabilities of resource managers, the IPC message formats, and the general structure. Through a set of exercises, implement the initialization of a simple resource manager as well as the handling of read() and write() operations.

Course Dates 2012

Course I

21st May – 25th May

Course II

19th November – 23rd November

Course Language / QNX Instructor

The course will be taught in English language.

The Senior Trainer will have a very strong QNX® expertise and be able to conduct the training course with a strong background of and experience in the QNX® technology used in highly critical industrial embedded projects and a multitude of other mission-critical projects.

Course Fee

Course attendees from various European countries are expected which is why per delegate attendee fees is outlined in three different currencies below. Typically, the local currency fee will apply.

Cost per delegate attending the course
€2,195 EUR
£1,835 GBP
$2,895 USD

This per delegate fee includes the course fee and training materials provided. Tea, coffee and soft drinks will be offered to course attendees during breaks. Lunch will be served every day during the 12:00 – 13:00 break.

Early Bird Discount

A special early bird discount of 10% will be offered to customers submitting their firm PO commitments confirming their attendance by no later than Friday 20th April 2012 (for Course I) and Friday 19th October 2012 (for Course II), subject to a purchase order received by that date.

Venue Location

The courses will be hosted at QNX Software Systems Hannover, Germany:

QNX Software Systems GmbH
Am Listholze 76
30177 Hannover
Germany
Tel: +49 (0)511 94091-0
Fax: +49 (0)511 94091-199

Travel

Due to its location, Hanover has good connections from all major cities in Germany through Deutsche Bahn.

Furthermore, Hanover is served by both the Hamburg to Kassel (Autobahn A7) running north and south and the Berlin to Dusseldorf (A2) running east and west.

Hanover airport (HAJ) handles many European major airlines, including a variety of budget airlines which will allow you to travel to Hanover from many European cities and this at low airfares.

There is a train that runs twice-an-hour (called the S-Bahn) from the airport to the central station (Hauptbahnhof).

As an option, taxis depart from every terminal and a taxi ride to the city center will take about 15 minutes.

Hanover has an excellent network of public transportation.

Accomodation / Hotel Recommendations

Various hotels are available as per your preference.

One of them is the 'Gästeresidenz Pelikanviertel' which is within 5 minute walking distance from QNX Germany:
http://www.gaesteresidenz-pelikanviertel.de/Who-are-we.php?expandable=0

The Sheraton Pelikan Hotel is close by as well and will offer more comfort and amenities, at higher accommodation rates:
http://www.sheratonpelikanhannover.com/en

If you need assistance with your hotel bookings or any further details please let us know.

Workstations

Experience shows that training course attendees prefer to bring their own laptops along, rather than working on a desktop host PC. Software set-up guidelines are provided prior to the training course both for the development host PC and the target system (typically, a VMware target simulation route is taken for training courses as it allows easy and quick set-up & it also offers a consistent and predictable environment for all participants). If required, temporary evaluation licenses can be provided for the purpose of the training course.

In case you prefer to work on a pre-configured desktop workstation in the training room please let us know so that a corresponding number of workstations can be set up in preparation for the course.

Course booking / contact

Please contact your QNX Account Manager or Alina Mariut (amariut@qnx.com, +49 (0)511 94091-261) for further details.